Remarks

Claims 1-28 remain pending after entry of this amendment. Claims 1, 5, 6, 13, 15, 16, 22, and 24-27 were amended herein. Favorable reconsideration is requested in light of the amendments made above, and the remarks offered below.

Claims 1-28 are rejected under 35 U.S.C. § 112, second paragraph. Applicant respectfully traverses this rejection.

Claims 1-28 are rejected under 35 U.S.C. § 102(e) as being anticipated by Vilhelmsson et al. U.S. Publication No. 2002/0024979. Applicant respectfully traverses this rejection.

Claims 1-28 are rejected under 35 U.S.C. § 102(b) as being anticipated by Harshaw, U.S. Patent No. 4,696,012. Applicant respectfully traverses this rejection.

35 U.S.C. § 112 Rejection

Claims 1-28 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention.

With respect to claim 1, the Examiner asserts that the claim fails to recite the structure of a tunable laser because although the claim recites the laser, the mirror and grating, it fails to show how the light output beam is generated. Applicant respectfully disagrees with the Examiner on this point. Claim 1 includes the clause "said guided-mode grating resonant filter pivotably mounted between said laser and said mirror wherein movement of said guided-mode grating resonant filter relative to said laser varies the wavelength of energy emitted from the laser". Applicant respectfully asserts that this does provide guidance as to how the light output beam is generated because it defines the position of the guided-mode grating resonant filter, the mirror, and the laser with respect to each other. This relative conformation of the device, along with the specific characteristics and functions of the components involved would show one of skill in the art how the light output beam is generated and affected by the device.

With respect to claims 6, 16, and 25-27, the Examiner asserts that the claims fail to recite the relation between elements in the tunable laser. With respect to the relation between the elements, Applicant respectfully asserts that the claims do provide the relation of the elements with respect to each other. This relative conformation of the device, along with the specific

characteristics and functions of the components involved would indicate the relation of the element to one of skill in the art.

Based on the amendments made to the claims and the remarks offered above, Applicant respectfully requests that this rejection should be withdrawn.

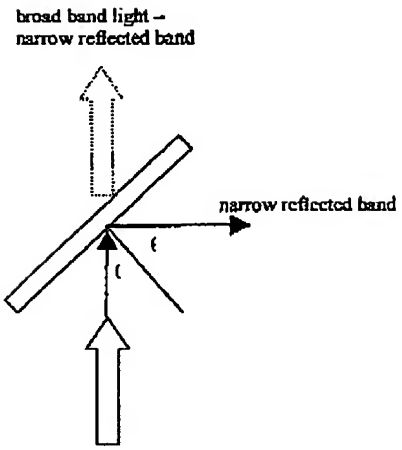
35 U.S.C. § 102 Rejections

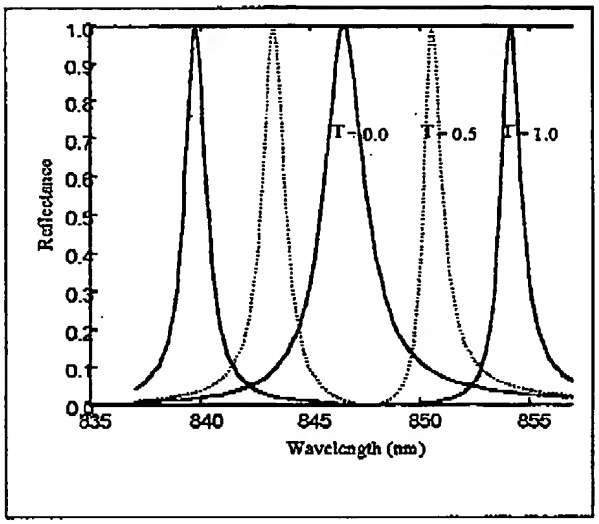
Claims 1-28 are rejected under 35 U.S.C. § 102(e) as being anticipated by Vilhelmsson et al. U.S. Publication No. 2002/0024979. Claims 1-28 are rejected under 35 U.S.C. § 102(b) as being anticipated by Harshaw, U.S. Patent No. 4,696,012. The claims have been amended to clarify that the grating of the device is a guided-mode grating resonant filter.

Neither Vilhelmsson nor Harshaw disclose a device that includes a guided-mode grating resonant filter. There is a fundamental difference between the device of the invention and that of either Vilhelmsson or Harshaw. This difference is based on both the basic component of the guided-mode grating resonant filter and the underlying physical principle behind the guided-mode grating resonant filter.

The device of the invention has a guided-mode grating resonant filter that is responsible for spectral wavelength control. A guided-mode grating resonant filter is a composite device that includes both a zero-order grating and a planar waveguide. The zero-order grating has a period much smaller than the wavelengths of interest such that no higher diffractive orders (either reflective or transmissive) are supported. A guided-mode grating resonant filter is not spectrally dispersive, as is a grating as used in Vilhelmsson and Harshaw.

Light incident on a guided-mode grating resonant filter is either transmitted through the device or reflected from the device with the reflected angle equal to the incident angle (zero order). This phenomenon is illustrated pictorially below.





The composite grating and waveguide that make up the guided-mode grating resonant filter interact with one another to produce a narrow notch spectral filter in reflection such that the center wavelength of the notch waveband varies with the angle of the incident light. Thus, rotating the guided-mode grating resonant filter tunes the cavity to a narrow spectral band.

The gratings disclosed in Vilhelmsson and Harshaw are not guided-mode grating resonant filters. The gratings of Vilhelmsson and Harshaw are traditional dispersive devices which support higher diffractive orders. In a grating such as this, one higher diffractive order, usually the first order, is selected for operation, and all incident light is reflected from the grating structure. The angle of the light reflected in first order now depends on the wavelength, even if all incident wavelengths enter at the same angle. Specific reflected wavelengths dispersed by the grating are selected for amplification by the gain medium by means of a small finite spatial aperture. In those cases where a waveguide is included, it serves merely as a device to transport and spatially limit the light. The waveguide is not integrated with the coating to interact in a mutually resonant manner. Because the gratings of Vilhelmsson and Harshaw are not guided-mode grating resonant filters, neither Vilhelmsson nor Harshaw anticipate the pending claims. Therefore, Applicant respectfully requests that this rejection be withdrawn.

Conclusion

If the Examiner believes a telephone conference would advance the prosecution of this application, the Examiner is invited to telephone the undersigned at the below-listed telephone number.

Respectfully submitted,

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